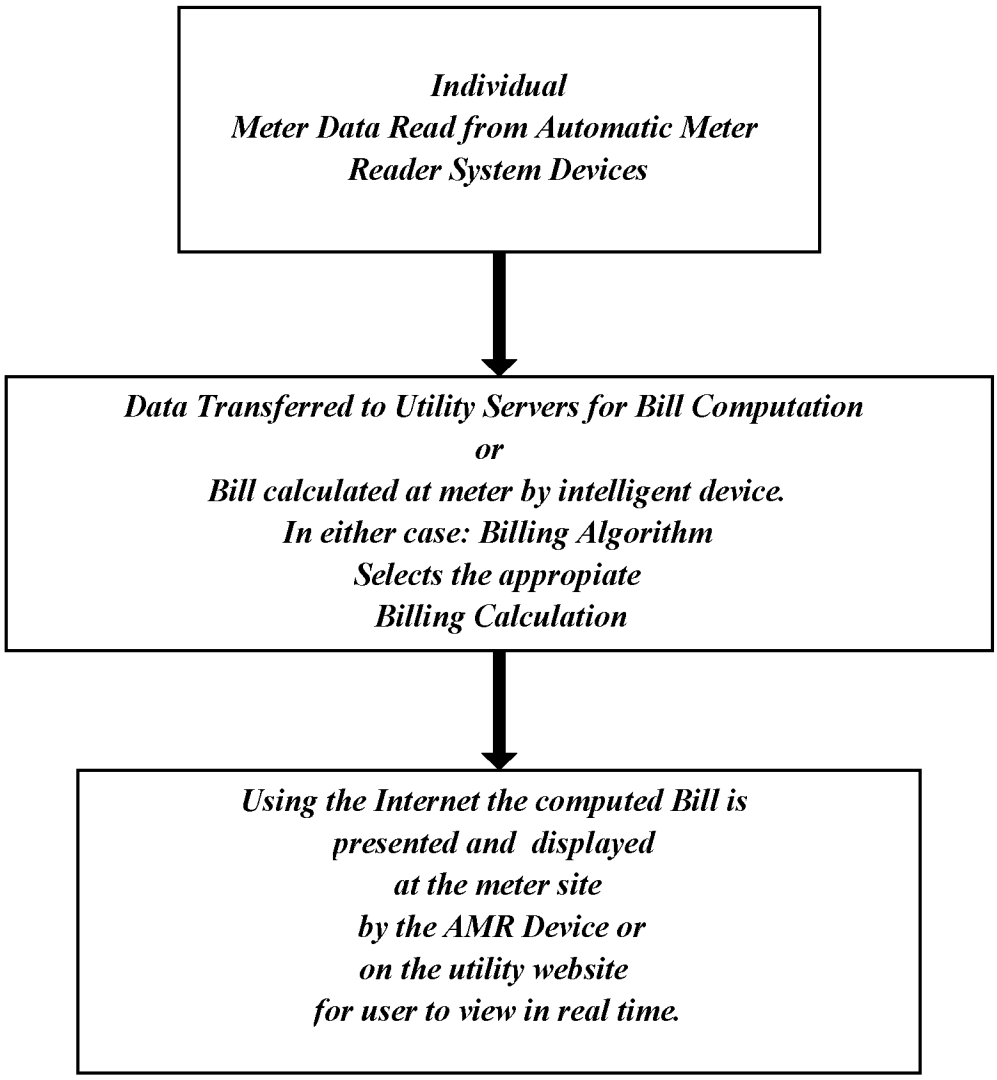
Individual
Meter Data Read from Automatic Meter
Reader System Devices
Data Transferred to Utility Servers for Bill Computation
or
Bill calculated at meter by intelligent device.
In either case: Billing Algorithm
Selects the appropiate
Billing Calculation
Using the Internet the computed Bill is
presented and displayed
at the meter site
by the AMR Device or
on the utility website
for user to view in real time.

Fig. 1

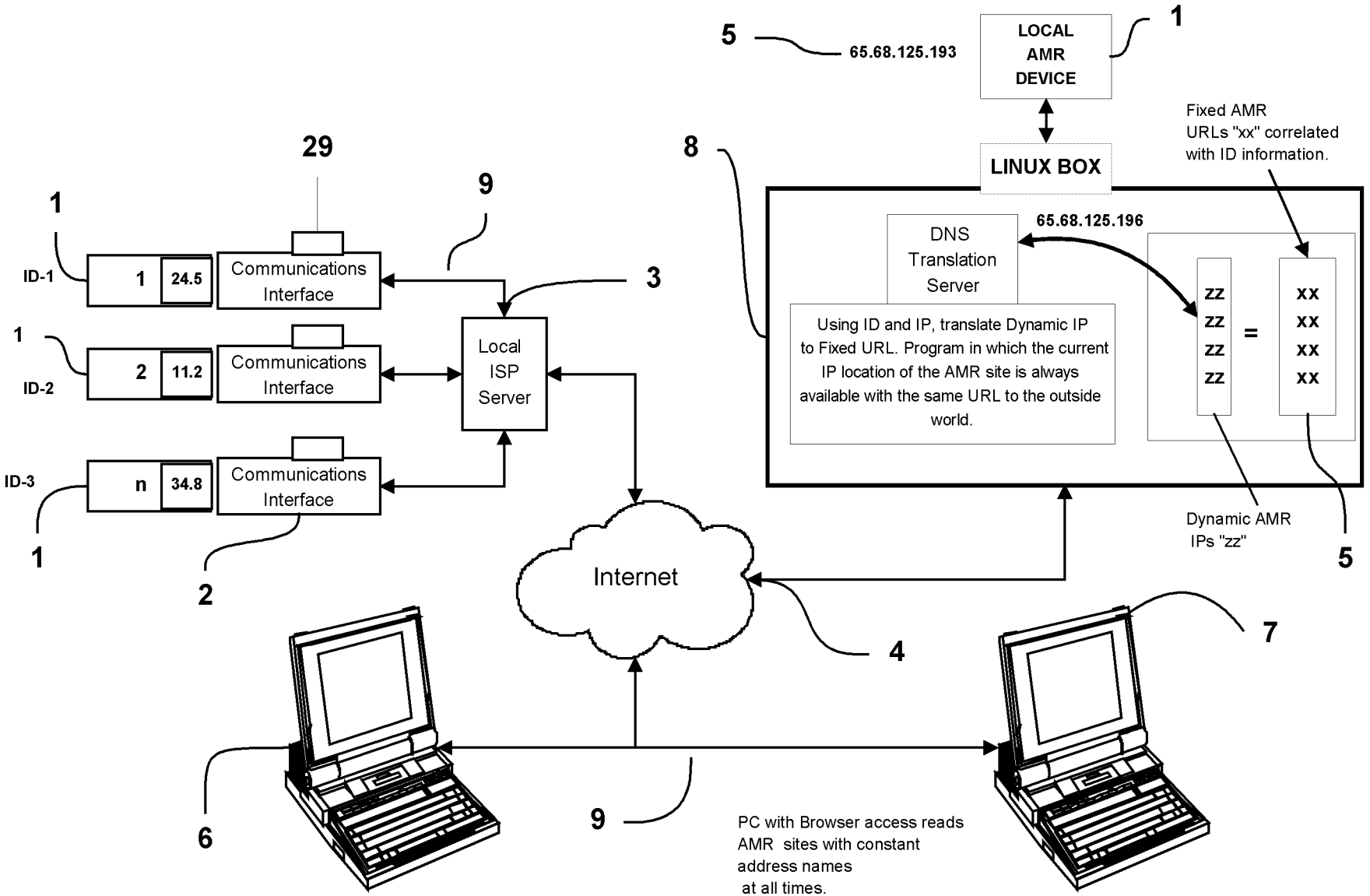
5
65.68.125.193
LOCAL AMR DEVICE
1
LINUX BOX
Fixed AMR URLs "xx" correlated with ID information.
8
65.68.125.196
DNS Translation Server
Using ID and IP, translate Dynamic IP to Fixed URL. Program in which the current IP location of the AMR site is always available with the same URL to the outside world.
zz zz zz zz
=
xx xx xx xx
Dynamic AMR IPs "zz"
5
29
9
1
ID-1
1
24.5
Communications Interface
3
1
ID-2
2
11.2
Communications Interface
Local ISP Server
ID-3
n
34.8
Communications Interface
1
2
Internet
4
7
6
9
PC with Browser access reads AMR sites with constant address names at all times.

Fig. 2

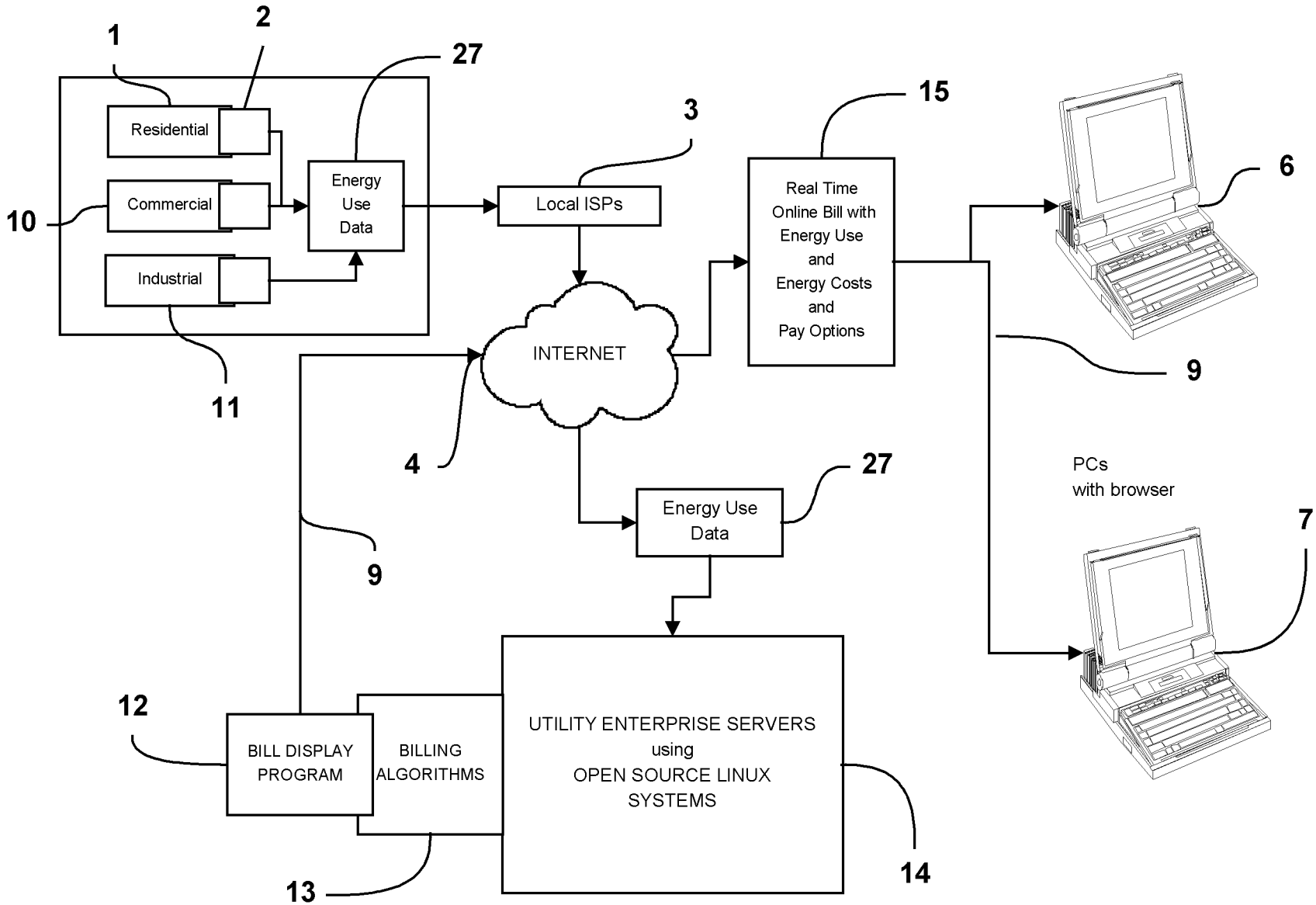
1
2
27
Residential
Commercial
Industrial
10
Energy
Use
Data
11
3
Local ISPs
15
Real Time
Online Bill with
Energy Use
and
Energy Costs
and
Pay Options
6
9
INTERNET
4
27
Energy Use
Data
PCs
with browser
7
9
12
BILL DISPLAY
PROGRAM
BILLING
ALGORITHMS
UTILITY ENTERPRISE SERVERS
using
OPEN SOURCE LINUX
SYSTEMS
13
14

Fig. 3

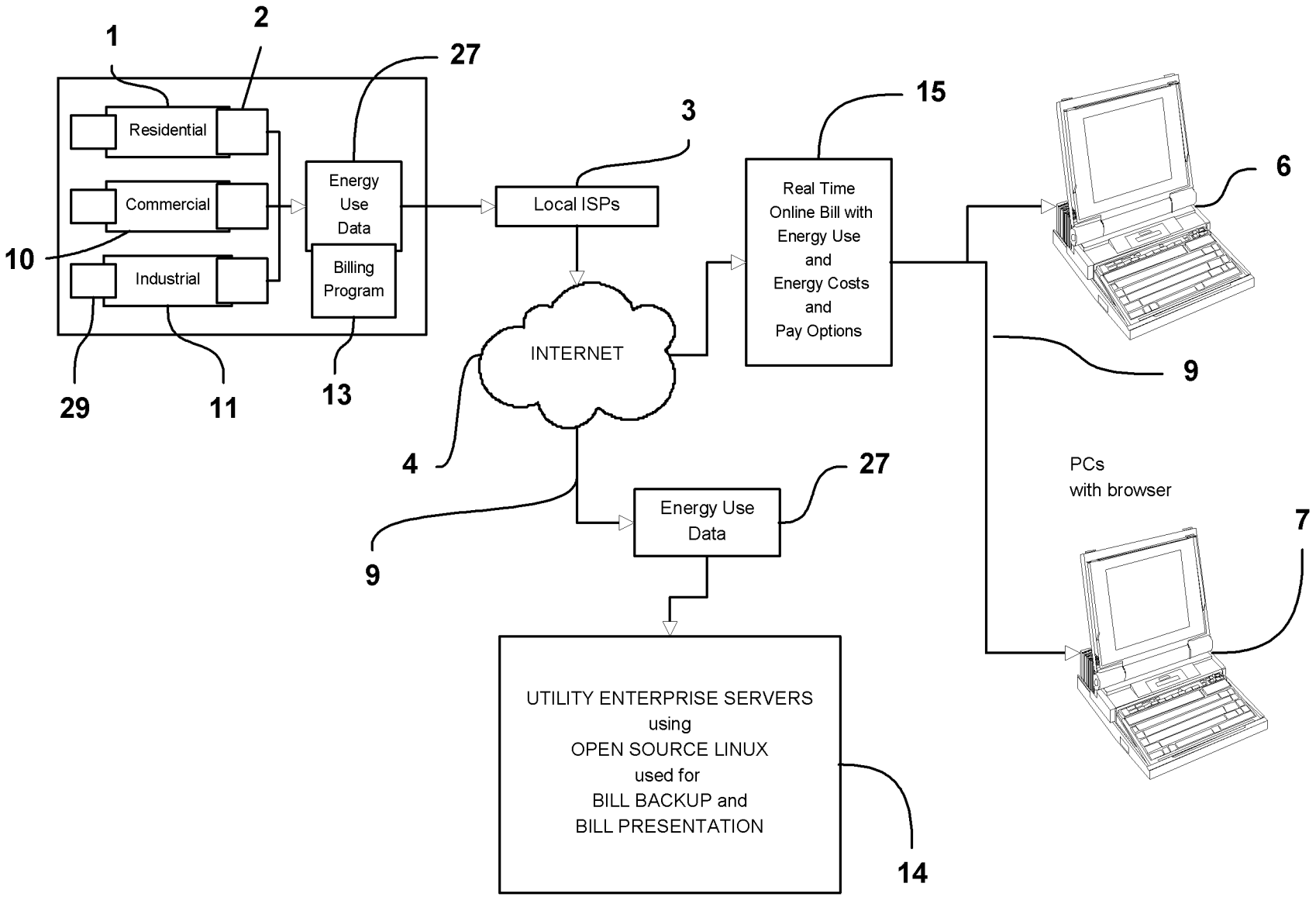
1
2
27
Residential
Commercial
Industrial
Energy Use Data
Billing Program
10
29
11
13
3
Local ISPs
15
Real Time Online Bill with Energy Use and Energy Costs and Pay Options
6
INTERNET
4
9
27
Energy Use Data
9
PCs with browser
7
UTILITY ENTERPRISE SERVERS using OPEN SOURCE LINUX used for BILL BACKUP and BILL PRESENTATION
14

Fig. 4

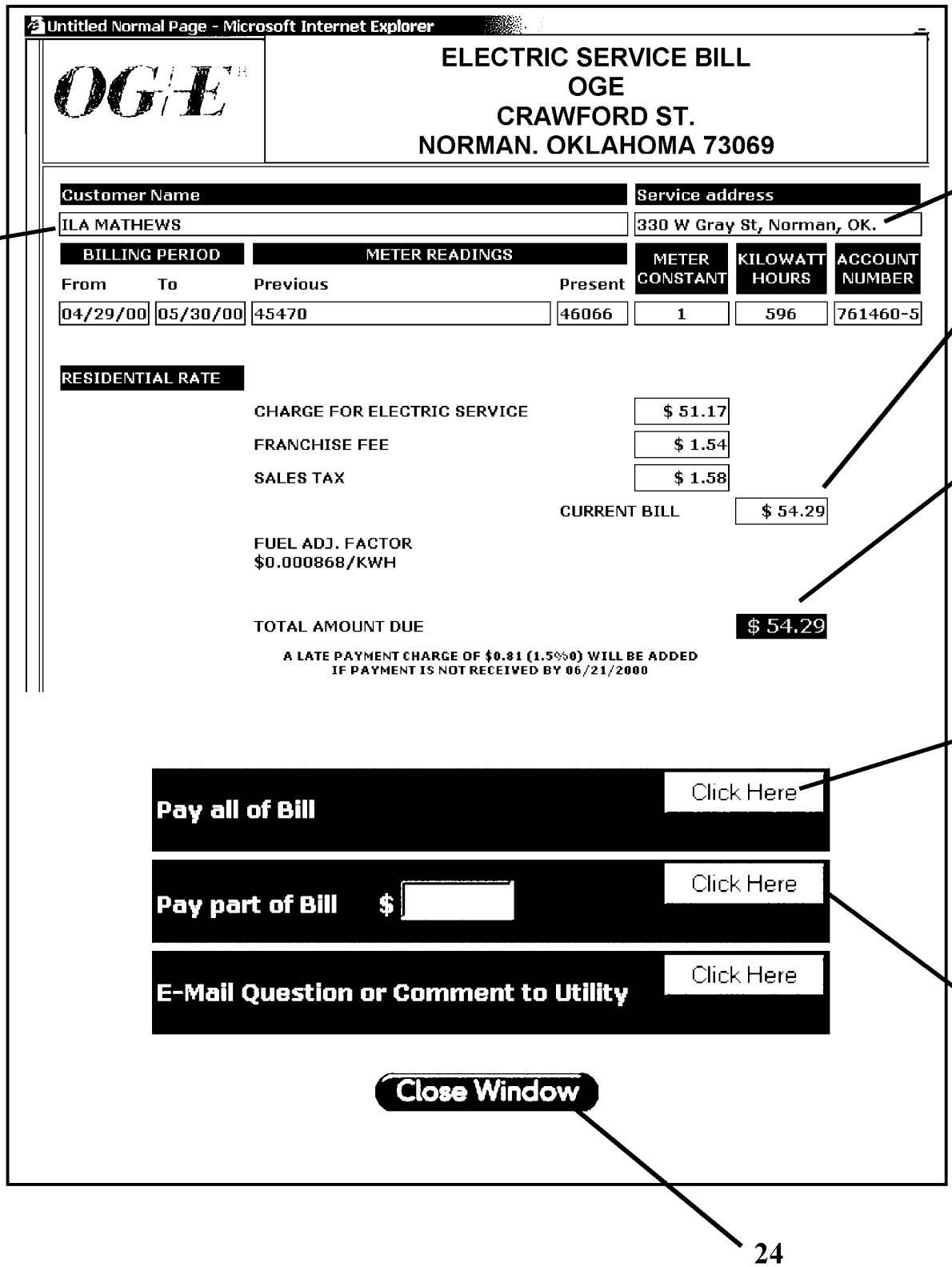
Untitled Normal Page - Microsoft Internet Explorer
OGE
ELECTRIC SERVICE BILL
OGE
CRAWFORD ST.
NORMAN. OKLAHOMA 73069
Customer Name
Service address
ILA MATHEWS
330 W Gray St, Norman, OK.
BILLING PERIOD
METER READINGS
METER CONSTANT
KILOWATT HOURS
ACCOUNT NUMBER
From
To
Previous
Present
04/29/00
05/30/00
45470
46066
1
596
761460-5
RESIDENTIAL RATE
CHARGE FOR ELECTRIC SERVICE
$ 51.17
FRANCHISE FEE
$ 1.54
SALES TAX
$ 1.58
CURRENT BILL
$ 54.29
FUEL ADJ. FACTOR
$0.000868/KWH
TOTAL AMOUNT DUE
$ 54.29
A LATE PAYMENT CHARGE OF $0.81 (1.5%0) WILL BE ADDED
IF PAYMENT IS NOT RECEIVED BY 06/21/2000
Pay all of Bill
Click Here
Pay part of Bill
$
Click Here
E-Mail Question or Comment to Utility
Click Here
Close Window
17
18
19
20
22
23
24

Fig. 5

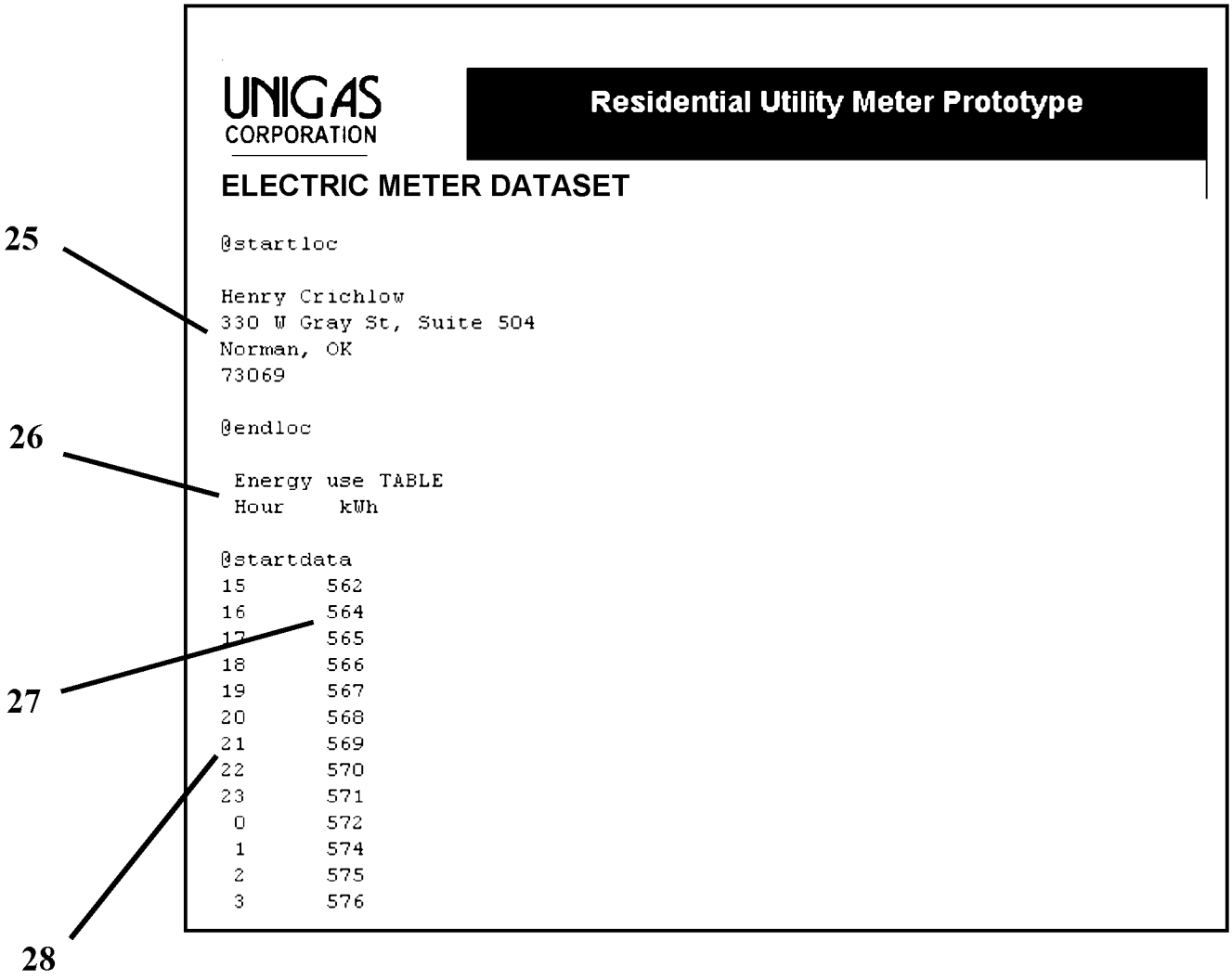
UNIGAS
CORPORATION
Residential Utility Meter Prototype
ELECTRIC METER DATASET
@startloc
Henry Crichlow
330 W Gray St, Suite 504
Norman, OK
73069
@endloc
Energy use TABLE
Hour kWh
@startdata
15 562
16 564
17 565
18 566
19 567
20 568
21 569
22 570
23 571
0 572
1 574
2 575
3 576
25
26
27
28

Fig. 6

Possible Modes

I	Server mode - meter device reads data and sends to server to compute, & display bill as webpage on company server.
II	Client mode - meter device computes bill, displays bill online as webpage at meter site. Client meter behaves like a microserver device.
III	Hybrid Server mode - Meter device computes bill, send info to server for display and bill payment. Bill is displayed at both meter site and company server site.

Fig. 7

I	Server Based - bill is computed, presented, stored, displayed and paid at company server

Step	Action Implemented
1	Meter energy use data is obtained by metering device
2	Usage data sent via isp and internet to company server
3	Company server selects the appropiate billing algorithm
4	Company server program computes bill
5	Bill data is converted to HTML or XML code
6	Bill data is displayed on website as online bill
7	Process loops continuously from 1 through 6 to provide real time updating of billing data
8	Customer logs on to website
9	Customer reads bill online
10	Customer decides to pay bill online or pay via offline channels like mail

Fig. 8

II	Client Based - bill is computed, presented, stored, displayed and paid at meter microserver
Step	Action Implemented
1	Meter energy use data is obtained by intelligent metering device
2	Billing algorithm is coded into program at meter site
3	Client device computes bill
4	Bill data is sent to company server via internet and stored on company server as backup
5	Bill data is converted to HTML or XML code at client microserver
6	Bill data is displayed online at webpage on client microserver
7	Process loops continuously from 1 through 6 to provide real time updating of billing data
8	Customer logs on to website via internet
9	Customer reads bill online at meter microserver
10	Customer decides to pay bill online or pay via offline channels like mail

Fig. 9

III Hybrid Based - bill is computed, presented, stored, displayed and paid at company serve and or meter site.

Step	Action Implemented
1	Meter energy use data is obtained by intelligent metering device
2	Billing algorithm is coded into computer software at meter site
3	Client device computes bill, behaves like a micro-server
4	Action (1)
5	Computed bill data is sent to company server via internet
6	Computed bill data is converted to HTML or XML code on company server
7	Computed bill data is displayed on website as online bill on company server
8	Action (2)
9	Computed bill Data is stored at client meter site
10	Computed bill data is converted to HTML or XML code on client meter site
11	Computed bill data is displayed on website at meter microserver as online bill
12	Process loops continuously from 1 through 11 to provide real time updating of billing dat
13	Customer logs on to internet and finds websites at meter or at company URL locations
14	Customer reads bill online either at company server or at meter microserver itself
15	Customer decides to pay bill online or pay via offline channels like mail

Fig. 10

PRICES:

Customer Charge: $6.50 per customer per month

Time-of-Use Meter Charge: $6.00 per customer per month for five Summer Season months.

Energy Charge:

Summer Season: The five OG&E Revenue Months of June through October.

On-Peak Hours: 20.55c per kWh per month. From June 1 through September 30, beginning each day at 1:01 PM through 7:00 PM local time, excluding Saturdays, Sundays, Independence Day (as observed) and Labor Day.

Off-Peak Hours: 3.18c per kWh per month. All hours not defined as On-Peak hours.

Winter Season: The seven OG&E Revenue Months of November through May of the succeeding year.

First 600 kWh per month: 7.8 c per kWh.
All additional kWh per month: 3.18c per kWh.

Fig. 11

Customer Charge/Month			$6.50	(a)
TOU Meter Charge/Month			$6.00	(b)
Energy Charge - Summer Season				
On Peak Hours Costs		$0.2055	KwHr/Mo	(c)
Off Peak Hours Cost		$0.0318	KwHr/Mo	(d)
Energy Use				
On Peak Hours KwHr		2,345	KwHr	(e)
Off Peak Hours KwHr		488	KwHr	(f)
Total Energy Use		2,833	KwHr	(g)
Energy Costs				
Off Peak Use		$481.90		(h)
Off Peak Use		$15.52		(i)
Total Energy		$497.42		(j)
Total Costs =	$509.92			(k)

Calculation Algorithm : (k) = (a) + (b) x [(e) x (c) + (f) x (d)]

Fig. 12

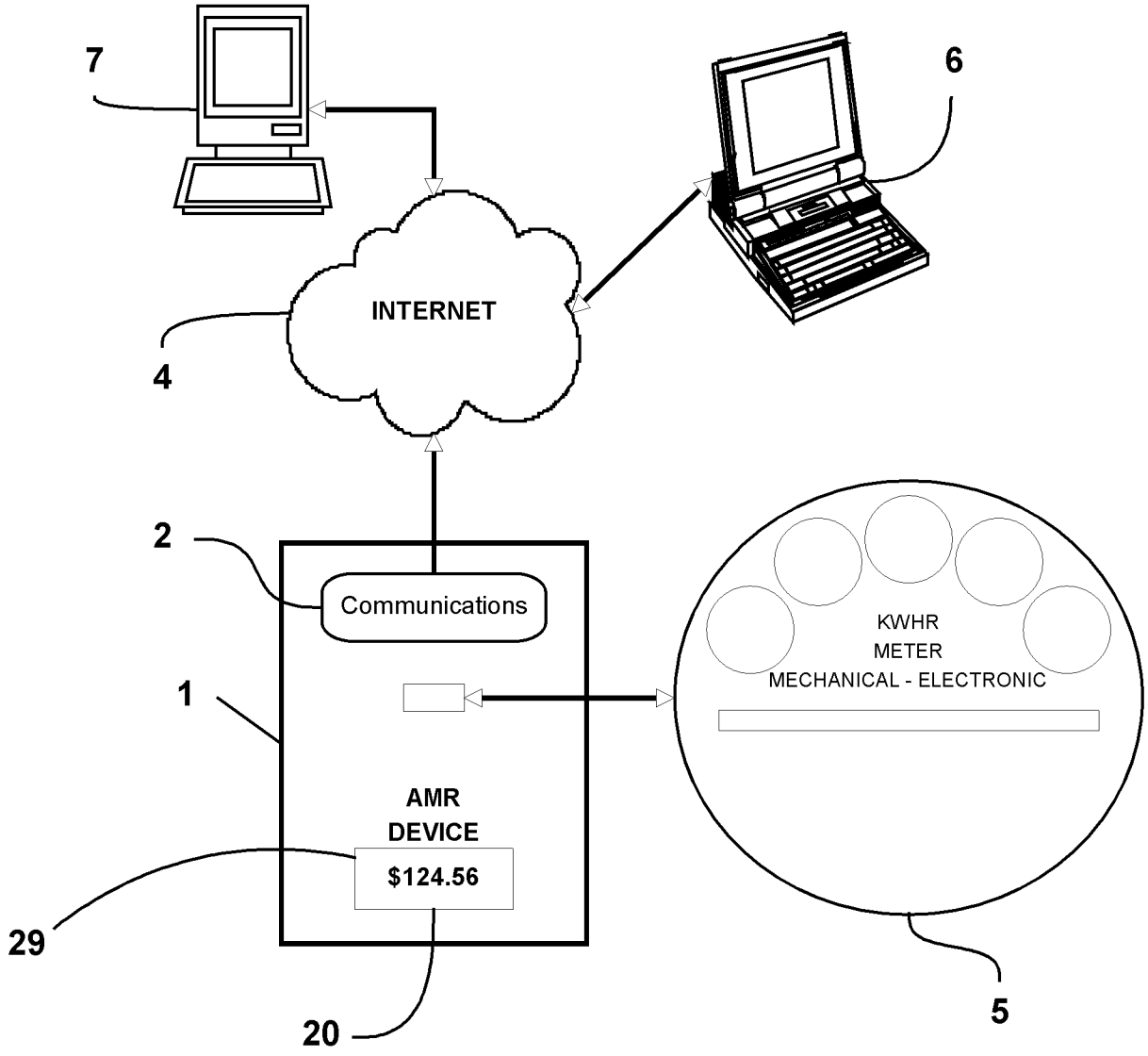
7
6
INTERNET
4
2
Communications
1
KWHR
METER
MECHANICAL - ELECTRONIC
AMR
DEVICE
$124.56
29
20
5

Fig. 13